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ABSTRACT

The tele-blackboard is an audiovisual system, the core of which is a tableau on which is put a normal piece of paper. The paper is written on with a pencil that goes with the tableau, and the visual information is transformed into narrow banded signals which are sent simultaneously with a verbal explanation by normal longwave radio transmitters. Visual and verbal information are thus transmitted across long distances at very low cost and can be received by normal radio and television receivers with special adapter. The tele-blackboard was designed for instruction in developing countries. It requires prior preparation of short, well organized teaching phases and high concentration by the pupils, while at the same time releasing the teacher from the anxiety of being on television. Other advantages offered by the tele-blackboard are the opportunity its use provides to develop original and modern forms of fundamental education, the reduction of loss of information which verbal information alone is subject to (particularly when the language used in the presentation is a second language for the students), and the capacity for producing dynamic content and concepts. (SH)

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TELE-BLACKBOARD

Short description

The tele-blackboard or electronic blackboard is an audio-visual system for instructional objectives. It is developed by the Technical University, Delft, (The Netherlands) in co-operation with the Technical University, Bandung, (Indonesia) illustrating the inter-university co-operation between the Netherlands and Indonesia. This system may promote, it is to be hoped, a rapid introduction of fundamental education, notwithstanding the big shortage on qualified teachers.

The core of the tele-blackboard is a tableau on which is put a normal piece of paper. The paper is written and sketched upon with a pencil which goes with the tableau. The visual information of the tableau is transformed into narrow-banded signals, so narrow banded that they are sent simultaneously with the verbal explanation, the spoken word, by a normal long wave radio-transmitter. Visual and verbal information are thus transmitted across long distances at very low cost. The signals are received by a normal radio-receiver e.g. a transistor. A television receiver is also required at the reception point and apparatus to take out the visual signals hidden between the audio-signals and to transfer them into visual information suited to a television set. It is possible to connect this de-coder with a number of tv sets connected in parallel.

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Media-didactic potentialities of the tele-blackboard

The tele-blackboard is an audio-visual medium which one at first imagines is a combined blackboard and television. But on some reflection the tele-blackboard does not line up with the media-facts. Thus in order to determine the potentialities we have to get away from the well-known media: blackboard and television. Thus the question arises: what kind of information does it communicate and what kind of information does it not communicate, and what are the corresponding didactic-implications.
The information communicated by the tele-blackboard can be in:

- the spoken word,
- the written word,
- particular visual images: pictures true to structure, models, outlines, diagrams and such like.

The way of information-presentation via the tele-blackboard is a special one: the written symbols and the visual images come into being respectively - they are build up before the eyes of the pupils. A total image cannot be given all at once. Thus we always have to do with a "growing-text", a "growing-model". If the tele-blackboard teacher has filled the paper on the tableau he can wipe the tableau by pulling over a switch. He then takes a new sheet of paper and continues his explanation. Errors in letters and lines are to be erased by simply tracing over superficially with the pen (again in combination with a switch). This correcting possibility is of far-reaching didactic potentiality. Because the erasing possibility implies that the build-on word and image also can be broken down, then afterwards the tele-blackboard teacher can build up again text and model possible in variation e.g. not line A --- B, but line A--- C.
In consequence of the visible and experienced growth to the final-phase and the potentiability of building up and breaking down of the sub-subject-matter , the insight-learning is essentially stimulated and the simple learning-by-heart of facts and processes discountered.

The tele-blackboard medium doest not communicate pictures true-to-nature, the so-called half-tones, those images we are used to seeing on television. No doubt this is a disadvant age in the transmission of information in the teaching-learning process. We need not go into the significance of pictures in learning now, sufficient is to say that pictures replace reality to a certain degree. However the fact that we cannot show true-to-nature pictures is more than compensated by the above media-potentialities and by the low cost.
Besides that we have to consider the following points.

. In the teaching-learning process the picture as such is not necessarily as important as the structure or content of the picture, and this structure can be sketched on the tableau, while the spoken word takes charge of the verbal coverage.
. The tele-blackboard teacher does not run the risk of becoming involved in the entertainment domain of the picture-television.
. The tele-blackboard teacher is compelled to visualize his subject-matter to an optimum. If he does not succeed he cannot run to the help of the picture.
. The tele-blackboard does not need expensive ready-made software.

Research findings thus far

The research done thus far are pilot studies. These studies served the objective to test the media-didactic potentialities of the tele-blackboard. A great number of short experiments, about 50, I hope will be done in autumn of this year at a comprehensive school near Utrecht. In these experiments the tele-blackboard is used as a full teaching-tool in the teaching-learning process. The findings of the pilot studies, however, are here presented.

. In consequence of the relatively small surface of the tableau and the time needed by the inter-change of the filled paper, the teaching is to be given in short successive phases. This phasing compels the teacher tp prepare his lessons thoroughly.

. The paper for the tableau can be prepared prior to presentation (I will show you at the end of this talk some examples of this). Such preparation has the advantage that during the broadcast of the lesson the lines, letters, etc. can be traced so that they conform exactly to the prepared paper. Thus during the broadcast the tele-blackboard teacher can concentrate on a dynamic presentation of the structure visible to him but still hidden from the pupils. Relaxed he can trace the written words and visual images.

. The system has for the tele-blackboard teacher the advantage that he cannot be seen, not even his hand in writing and sketching. Thus the tele-blackboard teacher feels free; he is much less tensed than by teaching on television.
Being invisible has the further advantage for the tele-blackboard teacher that during the broadcast he has the constant opportunity to glance over his lesson-scheme. The pilot studies clearly showed that in combination with the preparation of his papers for the tableau the tele-blackboard teacher is confident about the succesful end of his performance.

. The tele-blackboard teacher has also to study thoroughly media-didactics; at the same time he has to train himself in becoming technically skilled in the use of the tele-blackboard.

. The tele-blackboard is a very direct teaching-tool. It requires a high concentration of the pupils. During the pilot studies it was very obvious that the children essentially engaged do take part in the thinking and doing of the tele-blackboard teacher. Probably this is caused (besides the totally different teaching-situation) by the proceeding of the movement at the tele-blackboard in combination with the spoken word. Thus the broadcastings will be short, perhaps 15 to 20 minutes maximum. The above-mentioned necessity for a very careful phasing (ordering) of the theme material is of great didactic gain.

. The tele-blackboard is by its nature a'contact-poor' medium. This is caused by the absence of the image true-to-nature, the so called half-tone: the visible teacher at the tv-screen. On the other hand the absence of the teacher at the screen has the advantage that between the person training the subject-matter with the children per exemplaar

an assistant teacher and the children there is no third person. A lesson via the tele-blackboard is, so to say, a document "handed" to pupil and assistant teacher.

The application of the tele-blackboard

The tele-blackboard was constructed for the developing world, especially for Indonesia. To this background I want to make here some remarks in relation to the media-didactic potentialities of the tele-blackboard and to the educational research findings in the developing world ').

- The tele-blackboard gives the opportunity to develop original and very modern forms of fundamental education. (Of course the medium can also be used for the presentation of information for all kind of objectives.
- In bi-lingual Indonesia (± 150 languages)the Bahasa Indonesia is the official language. This language now is to be taught and at the same time is the one in which the different subjects are to be taught. Loss of information in the teaching/learning process will be unavoidable. By use of the tele-blackboard as note-pad and above all as a medium for vizualisation of concepts and processes (with the potentiality to gradual building up and breaking down) in combination with the necessary phasing which can lead to the smallest learning-steps, it is possible to reduce the loss of information and in consequence reduce the difficulties for the pupil.
- Optimal media-didactic use of the tele-blackboard is dynamic to a high degree. Thus it is pre-eminently suited not only to learn to see, to distinguish and to name "things", but especially to learn to compare and to order, to learn to see relations, to learn to see cause and effect, to distinguish the static from the dynamic, and thus to create the potentialities for the development of thinking. The forming of these attitudes is a basic condition to understanding the functioning of subject-matter as such.

The preparation of the lessons at the broadcasting site and the assimilation at the reception site, has the following advantages.

- The lessons are good, given by good teachers; lessons for a big audience are worth while(research MPATI).
- It is possible to develop uniform assimilation-material (low cost factor).
- Reflection on and study of the educational media and of the media-didactics; the tele-blackboard encourages this kind of pedagogic-didactic work.
- Fundamental education will get a pedagogic-didactic deepening.
- Educational research is promoted.
- The training of teachers will be stimulated.
- The assistant teachers at the reception site get in-service training especially owing to the"good" lessons. This in-service training has relevance to the subject-content, to the pedagogic-didactic education and to the forming of attitudes.

In a territory so vast as Indonesia there are to be solved also a big number of logistic problems as to the introduction of fundamental education. It is the intention to realize in Djakarta an experimental set-up of the tele-blackboard this autumn. May this experimental set-up be the start of a development leading to the introduction of fundamental education for everybody.

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